RECONNAISSANCE REPORT

September 2000

ST. JOSEPH RIVER AND SPY RUN CREEK, INDIANA

ECOSYSTEM RESTORATION AND FLOOD DAMAGE REDUCTION

US Army Corps
of Engineers®
Detroit District

Reconnaissance Report, Section 905(b) (WRDA 86) Analysis

St. Joseph River and Spy Run Creek, Indiana

Ecosystem Restoration and Flood Damage Reduction Study

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1. STUDY AUTHORITY

a) The St. Joseph River and Spy Run Creek Study was authorized by a citation from the House Committee Report 106-253 (House Appropriations Committee), supporting the Energy and Water Development Appropriations Act, 2000 (H.R. 2605, Public Law 106-60).

"St. Joseph River and Spy Run Creek, Indiana – The recommendation includes funding for a reconnaissance study of flooding problems along the St. Joseph River in the vicinity of Leo-Cedarville, Indiana and along Spy Run Creek in the vicinity of Fort Wayne, Indiana. Among other things, this study will assess the potential creation of wetlands to reduce downstream flooding."

b) Funds in the amount of $ 100,000 were appropriated in Fiscal Year 2000 to conduct the reconnaissance phase of the study.

2. STUDY PURPOSE

The purpose of this study is to determine if there is a Federal (Corps) interest in providing solutions to ecosystem degradation, flooding, and other related water resource problems and needs in Spy Run Creek, Fort Wayne, Indiana and the St. Joseph River in the vicinity of Leo-Cedarville, Indiana. Both sites are located in Allen County, Indiana and are part of the Maumee River Watershed. Federal interest requires that: a flood damage reduction project would be economically feasible and in compliance with current regulations and policies; and that a willing and financially capable local sponsor be found. For aquatic ecosystem restoration projects, the Federal interest requires that: the project will improve the quality of the environment, is cost-effective and in the public interest, and a willing and financially capable local sponsor can be found. In response to the study authority, the reconnaissance phase of the study was initiated on November 5, 1999. This phase of the study has resulted in the finding that there is a Federal interest to continue into the next phase for two (2) Continuing Authorities Program (CAP) projects. CAP allows the Corps of Engineers to construct limited river and harbor improvement projects not specifically authorized by Congress when the Chief of Engineers determines that the work is advisable.

The first recommendation is for a flood control project at Spy Run Creek, Fort Wayne, Indiana authorized under Section 205 of the Flood Control Act of 1948, as amended. The second recommendation is for an aquatic ecosystem restoration project along Spy Run Creek at Franke Park, Fort Wayne, Indiana authorized under Section 206 of the Water Resources Development Act (WRDA) of 1996.

This report will document the basis for these findings and establish the scope of the next phase of work. The Section 905(b) (WRDA 86) Analysis establishes the scope of the Section 205 feasibility study and is used as the Scope of Work chapter of the Project Study Plan. Also, as the document that establishes the scope of the next phase of work, the Section 905(b) (WRDA 86) Analysis is used as the Preliminary Restoration Plan for the proposed Section 206 CAP project.

3. LOCATION OF STUDY, NON-FEDERAL SPONSOR AND CONGRESSIONAL DISTRICTS

This Section 905(b) (WRDA 86) Analysis report will evaluate two (2) sites, which are separate, but both in the vicinity of metropolitan Fort Wayne, Indiana. The first site is the Spy Run Creek in Fort Wayne, Indiana. This site will be referred to as Spy Run Creek. The second site is located along the St. Joseph River in the vicinity of Leo-Cedarville, Indiana and the Cedarville Reservoir. This site will be referred to as the St. Joseph River - Cedarville Reservoir.

a) Location

1) Spy Run Creek. The Spy Run Creek is about 7 miles in length and drains approximately 15 square miles of northwestern Fort Wayne and Allen County. Spy Run Creek begins northwest of Fort Wayne in Washington Township and flows southerly to Franke Park, then flows southeasterly to the St. Mary's River. The downstream end of the watershed includes high-density residential areas in Fort Wayne. The central part of the watershed is comprised of high-density commercial and industrial development with some scattered residential clusters. The northeast part of the watershed includes mostly lower density residential development. In the northwest portion of the watershed, farms, larger industrial parks, low density residential, and trailer parks are the predominate land use. Most of the undeveloped land in the watershed (approximately 5.3 square miles) lies in the west and northwest part of the watershed, in unincorporated Allen County.

2) St. Joseph River - Cedarville Reservoir. The Cedarville Reservoir is a 245-acre impoundment on the St. Joseph River at the town of Leo-Cedarville, about six miles northeast of Fort Wayne, Indiana. The St. Joseph River flows into the reservoir at the northeast end. The outlet of the reservoir is the St. Joseph River, which joins with the St. Mary's River in Fort Wayne and forms the Maumee River. The reservoir is owned by the City of Fort Wayne and is part of the municipal water supply. The Cedarville Reservoir watershed drains approximately 764 square miles and has a hydraulic retention time of about 13 days.

b) Non-Federal Sponsor.

1) The City of Fort Wayne has been identified as the non-Federal sponsor for the recommended Continuing Authority Program project's on the Spy Run Creek.

2) The Detroit District, Corps of Engineers did not recommend a project for the St. Joseph River – Cedarville study site.

c) Both study areas lie within the jurisdiction of the Fourth Congressional District, Indiana (Congressman Mark Souder-R).

4. PRIOR REPORTS AND EXISTING PROJECTS

a) The following reports were reviewed as a part of this study:

Spy Run Creek

1) *Preliminary Feasibility Report for Flood Control, Fort Wayne and Vicinity, Indiana, dated June 1976,* prepared by the U.S. Army Corps of Engineers, Detroit District. The purpose of this report was to provide preliminary information on the development of flood control measures, both structural and non-structural, taking into consideration water quality, water supply, and recreation.

2) *Investigation of Potential Trout Stream in Fort Wayne, 1985,* prepared by the Indiana Department of Natural Resources, Division of Fish and Wildlife (Jed Pearson). This report summarizes the field investigations and includes recommendations for development of a trout stream in Fort Wayne. The report indicated that Spy Run Creek in Franke Park offers potential for development of a "put-and-take" stocking program for trout. Since publication of this report, the put-in-take trout stocking program was initiated.

3) *Fort Wayne and Vicinity, Indiana, Flood Control Study, dated July 1986,* prepared by the U.S. Army Corps of Engineers, Detroit District. The purpose of this report was to provide preliminary information on the development of flood control measures, mainly structural, for Fort Wayne, Indiana, and vicinity.

4) *Final Feasibility Report Final Environmental Impact Statement, Fort Wayne and Vicinity, Indiana, Flood Control Study, dated September 1987,* prepared by the U.S. Army Corps of Engineers, Detroit District. The purpose of this report was to summarize the problems, needs and alternative solutions for flood control at Fort Wayne, to present the results of plan formulation, to identify specific details of the selected plan, and notify the public of the recommended plan. Plan formulation and analysis included evaluation of several plans to divert flood flows via a Trier cutoff and several plans for reconstruction of an existing levee with either evacuation or new levees for other areas. The recommended plan was to upgrade 35,000 feet of existing levees along the St. Mary's, St. Joseph, and Maumee Rivers, and Spy Run Creek. Existing flood protection along the Spy Run Creek consisted of 1,350 linear feet of earth levees and 1,850 linear feet of earth-filled sheet pile cribs. These structures are located along the east side of the creek starting at the confluence with the St. Mary's River and continuing upstream to Elizabeth Street.

5) *Current Fish Resources and Fishing Opportunities in Fort Wayne, Indiana, 1990,* prepared by the Indiana Department of Natural Resources, Division of Fish and Wildlife (Jed Pearson). This report was prepared to inventory fish resources, fishing activity, and potential opportunities for improvements within the city. Three (3) recommendations were made which directly involved Spy Run Creek. The first was to enlarge and deepen Shoaff Lake in Franke Park, which has accumulated considerable amounts of nutrient-laden sediments and has very poor water quality. In 1997, the City of Fort Wayne accomplished the deepening work on Shoaff Lake as recommended in this report. The second recommendation was to impound Spy Run Creek by constructing a dam in the northwest quadrant of Franke Park. The enlargement would provide better fishing opportunities and act as a sediment trap and wetland area along Spy Run. The third recommendation was to remove or modify the dam on Spy Run Creek in Franke Park. This was recommended in order to increase stream velocity. The recommendation also included construction of riffle-pool complexes and boulder runs for in-stream fish cover.

6) Spy Run Watershed Master Plan, dated February 1996, prepared for the City of Fort Wayne Storm Water Engineering Department by RUST Environment and Infrastructure. The focus of this report was to identify and solve existing storm water flooding problems and provide policy recommendations to prevent future problems. Several potential improvements were developed to address over bank flooding along Spy Run Creek and its larger tributaries. It was determined that flooding along the downstream reach of Spy Run, from State Boulevard and south, was mostly due to backwater from the St. Mary's River. The report concluded that flooding in the backwater area must be remedied through the use of levees or by reducing flows on the St. Mary's River. For non-backwater effected portions of Spy Run Creek the recommendation was to construct four (4) storage facilities to reduce peak flows in the main channel of Spy Run.

St. Joseph River – Cedarville Reservoir

1) *Lake Survey Report, Cedarville Reservoir, Allen County, Indiana, dated November 30, 1967,* prepared by Gary Hudson, IDNR-Fish Management Biologist. The reservoir was surveyed to obtain information regarding species, composition, age and growth data, and limnological data. Prevalent aquatic emergent vegetation included cattail and arrow head. Sago was the only submersed aquatic observed in the reservoir. Nineteen (19) fish species were collected. Gizzard shad (24.5%), bluegill (14.8%), Carp (14.4%), and largemouth bass (13.5%) were the most common species. Poor quality of fishing at the Cedarville Reservoir was reported to be a direct result of poor environmental conditions. Habitat is limited by inadequate depth, lack of cover and high turbidity. Only species able to withstand these conditions, such as black bullheads and carp, are flourishing to a level where they also adversely impact fish habitat by roiling up bottom sediments. The report concluded that due to excessive numbers of bullheads and carp, it is unlikely that efforts to reduce inputs of additional sediments into the reservoir through various watershed management programs will improve fishing. Based on this, the Indiana Department of Natural Resource's recommended that no fish management activities be initiated.

2) *Cedarville Reservoir, Allen County, Fish Population Survey, 1986,* prepared by the Indiana Department of Natural Resources (Jed Pearson). The IDNR conducted a fish population survey to assess the potential impacts of construction of a hydroelectric power facility at the Cedarville Reservoir dam. A recommendation was made that the development of a hydroelectric facility would not seriously affect the present sport fishing opportunities because the reservoir doesn't, and probably cannot, support a higher quality sport fishery. Much of the reservoir is less than 4 feet and there is not enough oxygen to support fish below 5 feet in the summer. Fish kills occur regularly and conditions are not stable enough to allow older and larger game fish populations to develop. Turbidity, limits production of submergent aquatic plants. The report recommended that the Indiana Department of Natural Resources not initiate fish management activities.

3) *Cedarville Reservoir, Allen County, Fish Management Report, 1999,* prepared by the Indiana Department of Natural Resources (Jed Pearson). This report was prepared to determine if any walleyes (5,000) remain from a June 1997 release into the reservoir and to reassess the status of the fish community in the reservoir. Although more fish were collected in 1999 than in previous surveys, there were few shifts in the community over the past 33 years. Gizzard shad, black bullheads, carp, channel catfish, largemouth bass and white crappies have normally comprised the bulk of the community. The report indicated that the reservoir continues to support a poor quality sport fishery. Attempts to improve fishing opportunities by stocking white bass and walleyes were unsuccessful. No other fish stockings were recommended. The poor quality of fishing at Cedarville Reservoir is a result of poor environmental conditions. Habitat is limited by inadequate depth, lack of cover and high turbidity. This report concluded that the Indiana Department of Natural Resources should not initiate fish management activities.

b) This study is investigating potential modifications of the following projects(s):

1) The Fort Wayne and Vicinity Flood Control project includes structures on the east side of Spy Run Creek from its confluence with the St. Mary's River to Clinton Street, then along Clinton Street to higher ground near State Street.

5. PLAN FORMULATION

During the early phases of the reconnaissance study contact was made with a number of Federal, state, and local entities which expressed interest in the study and provided information used in the development and formulation of the Section 905(b) Analysis Report. The reconnaissance study contacts include:

- U.S. Geological Survey Offices in Ohio and Indiana
- Nature Conservancy of Indiana
- Indiana Department of Natural Resources
- Cedar Creek Township Assessor
- Leo-Cedarville Planning Commission
- City of Fort Wayne
- U.S. Fish and Wildlife Service, Bloomington, Indiana
- Indiana Department of Environmental Management
- St. Joseph River Watershed Initiative
- Allen County Conservation Reserve Program
- U.S. Department of Agriculture Natural Resource Conservation Service
- Allen County Soil & Water Conservation District
- Indiana Division of Historic Preservation and Archeology
- Ball State University

a) National Objectives

1) The national objective of water and related land resources planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statues, applicable executive orders, and other Federal planning requirements. Contributions to national economic development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the nation.

2) The Corps has added a second national objective for Ecosystem Restoration in response to legislation and administration policy. This objective is to contribute to the nation's ecosystems through ecosystem restoration, with contributions measured by changes in the amounts and values of habitat.

3) The following site evaluation and selection criteria were developed for evaluating ecosystem restoration and flood damage reduction alternatives in the reconnaissance study phase:

- There is a strong likelihood of developing a technologically feasible and cost effective project, using proven technology;
- Ecological resources within the study area are of demonstrated national, regional, or local significance;
- There is a reasonable probability that the identified restoration projects will contribute significantly to improvement in the ecosystem of the watershed and are within the authority of the Corps or non-Federal sponsor to implement;
- The Federal government may participate in improvements for flood control purposes, "if the benefits to whomsoever they may accrue are in excess of the estimated costs, and if the lives and social security of people are otherwise adversely affected" (1936 Flood Control Act);
- There is a reasonable assurance that a public entity (i.e. state or local unit of government) is capable and willing to participate as a non-Federal sponsor(s) in a cost shared project.

b) Public Concerns

Public concerns have been identified during the course of the reconnaissance study. Initial concerns were expressed in the study authorization. Additional input was received through coordination with the potential sponsor(s), and some initial coordination with other agencies. The public concerns that are related to the establishment of the planning objectives and planning constraints are:

Spy Run Creek

1) The City of Fort Wayne, Indiana is concerned about periodic flooding in the Eastbrook and Westbrook Avenues neighborhood. The Spy Run Creek runs through this residential area prior to its confluence with the St. Mary's River. In 1980 a flood protection project was constructed along the Spy Run Creek from its confluence with the St. Mary's River to Elizabeth Street. This consisted of 1,350 linear feet of earth levees and 1,850 linear feet of earth-filled steel sheet pile cribs along the east side of Spy Run Creek. Much of this protection was replaced by the current flood control project. The current Fort Wayne Flood Protection project stops at Clinton Avenue and does not extend west into this neighborhood. During 100-year storm events backwater from the St. Mary's river enters the Spy Run Creek and causes road overtopping and structure flooding in this Fort Wayne neighborhood. Flooding of varying severity has occurred in Fort Wayne about every 4 or 5 years, with serious damage being experienced in 1908, 1913, 1936, 1943, 1950, 1978, 1982, and 1985.

2) The City of Fort Wayne would like to improve water quality and clarity in Spy Run Creek.

St. Joseph River – Cedarville Reservoir

1) The town of Leo-Cedarville would like to restore land along the east bank of the Cedarville Reservoir. The land became available when Schwartz Road was relocated east of the reservoir about ¼ mile. One idea under consideration by the town is the establishment of a wetland and/or park like area along the east shore of the Cedarville Reservoir south of Hosler Road. The community would like to develop a plan to tie the wetland area into an educational type experience in conjunction with the nearby Cedar Creek and Mantea County Park.

c) Problems and Opportunities

Problems – Spy Run Creek

- ***Urbanization has resulted in a loss of wetland habitat***

There are no large expanses of wetlands left in the project vicinity. There are some significant wetlands to the west of Fort Wayne. The landscape near Spy Run is dotted with small palustrine-emergent, palustrine-forested, and palustrine-scrub/shrub wetlands. Many fringe wetlands along the Spy Run corridor have been lost to urbanization.

- ***The fishery of Spy Run has been compromised due to sedimentation and poor water quality***

Several studies conducted by the Indiana Department of Natural Resources indicate Spy Run has impaired aquatic and wildlife habitat. The probable source of impairment is identified as land development and surface runoff. The cause of impairment has been identified as priority organics and siltation. Past sediment sampling has shown elevated levels of polyaromatic hydrocarbons (PAH's) of unknown origin.

Although impairments exist, Spy Run still maintains designated uses of fish and wildlife habitat. IDNR conducted fish population studies in Spy Run at Vesey park and Franke Park in 1989 (*Current Fish Resources and Fishing Opportunities in Fort Wayne, Indiana, IDNR, 1990*). These studies indicated that Spy Run supports a good recreational fishery and is periodically stocked with trout for put-and-take fishing.

- ***The combination of lost floodplain storage due to urbanization and backwater from the St. Mary's River has created a chronic flooding problem in the downtown Fort Wayne area adjacent to Spy Run***

Historical development of downtown Fort Wayne has severely encroached upon the Spy Run Creek floodplain. The combination of lost floodplain storage and backwater from the St. Mary's has created chronic flooding problems in the area adjacent to Spy Run Creek. Flooding along this reach of the Spy Run Creek, from approximately State Boulevard to its confluence with the St. Mary's River, is primarily due to the backwater from the St. Mary's River. The backwater 100-year flood elevation is 759 ft. based on the HEC-2 analysis done during the previous Fort Wayne Flood Control project.

Along the Spy Run Creek, 20 of 31 bridges and culverts have sufficient capacity to pass the 100-year flood flow without overtopping. The remaining 11 structures experience some road overtopping during the 100-year flood event. Seven (7) bridges and culverts are in pressure flow conditions as early as the 10-year event.

The following 5 road crossings (Table 1) are located near the confluence of Spy Run Creek and the St. Mary's River. These 5 crossings are overtopped to depths ranging from 0.7 to 6.5 feet. The cause of overtopping is backwater from the St. Mary's River.

TABLE 1 - Road Overtopping Analysis

Location (Spy Run Creek)	Storm Frequency Corresponding to Full Flow Capacity	Depth of Overtopping in 100-Year Flood Event (Feet)
Elizabeth Street	< 10 year	3.6
Railroad Spur	50 year	0.7
Clinton Street	< 10 year	4.2
State Boulevard	< 10 year	6.5
Grove Street	50 year	1.0

According to the *Spy Run Watershed Master Plan, February 1996*, the remaining six (6) locations are not subject to the backwater effect of the St. Mary's. Recommendations made in the master plan are provided below:

Location 1) Franke Park is the largest park (290 acres) in Fort Wayne. Franke Park Road just upstream of Sherman Boulevard experiences 2.8 feet of overtopping during the 100-year event. Franke Park is on low ground and is subject to flooding during heavy rainfall events. Most of the overtopping of Franke Park Road is attributable to the bridge at Sherman Boulevard, which has 2 feet of head losses during the 100-year event. The master plan recommended leaving the situation as is. The plan concluded that if the bridge at Sherman Boulevard is replaced in order to eliminate the 2 feet of headloss, Franke Park Road would still be overtopped unless the road was raised by a least 0.6 feet. The report indicated that Franke Park Road is not a major roadway and is used primarily as an entrance to the Park facilities. Finally, restrictive culverts help reduce downstream flooding by holding back some of the water in Franke Park.

Locations 2-4) The following 3 areas experience overtopping during the 100-year event: at Washington Center Road (0.6 feet), Graham Drive (1.4 feet), and Goshen Avenue (0.2 feet). Damages were felt to be minimal and infrequent and not believed to warrant improvements.

Location 5) State Boulevard at Lowther Neuhaus Ditch is overtopped 0.4 feet during the 100-year event. Overtopping at this location is caused by backwater from the downstream reach of channel, rather than the culvert crossing at State Boulevard. The recommended solution was for raising the roadway elevation and providing additional culvert capacity.

Location 6) At Cascade Trailer Park Road overtopping (1.2 feet in the 100-year event) is a result of backwater from Spy Run Creek. Upstream regional detention on Spy Run would help reduce the backwater depth; however, the report concluded that this low area would still be prone to flooding during the 100-year event.

Problems – St. Joseph River & Cedarville Reservoir

- ***The Cedarville Reservoir has poor water quality and degraded habitat***

Habitat is limited by inadequate depth, lack of cover and high turbidity. Much of the reservoir is less than four feet deep and there is not enough oxygen to support fish below five feet in the summer. Fish kills occur regularly and conditions are not stable enough to allow older and larger game fish populations to develop. Turbidity, limits production of submergent aquatic plants. Attempts to stock white bass and walleye were unsuccessful.

- ***There are competing interests for use of the reservoir***

The City of Fort Wayne utilizes the reservoir for its municipal water supply. The reservoir and the property around its perimeter are owned by the City of Fort Wayne.

Opportunities – Spy Run Creek

- ***Reduce flood damages to neighborhoods along Spy Run Creek***

- ***Restore habitat along Spy Run to benefit plant and animal communities, reduce sediment transport, and improve water quality and aquatic habitat***

Spy Run is shown to have impairment to aquatic and wildlife habitat as noted in *Current Fish Resources and Fishing Opportunities in Fort Wayne, Indiana, IDNR, 1990*. The probable source of impairment is listed as land development and surface runoff. The City of Fort Wayne would like to improve water quality and clarity in Spy Run Creek. Creation of wetlands along the Spy Run corridor would restore a portion of lost wetland habitat while providing some flood storage capacity and associated benefits to water quality. Wetlands would improve the character of the riparian zone, providing additional valuable habitat for fish and wildlife.

- ***Improve fishery and increase recreational opportunities***

The City of Fort Wayne along with Indiana Department of Natural Resources would like an impoundment of Spy Run in the northwest quadrant of Franke Park to act as a wetland and sediment trap that would also provide fishing and boating opportunities. In addition, stream improvements in the wetland reach such as deep holes and strategically placed boulders would increase the amount and value of available fishery habitat.

Opportunities - St. Joseph River & Cedarville Reservoir

- ***Improve water quality and provided associated habitat benefits***

Habitat in the reservoir could be improved by deepening with associated sediment removal, and management of the reservoir for fish and wildlife uses.

- ***Establish a wetland and interpretive center/park along the east bank of Cedarville Resevoir***

The combined establishment of Leo-Cedarville has an interest in developing a wetland along the east bank. The community would like to develop a plan to tie the wetland area into an educational experience in conjunction with the nearby Cedar Creek and Mantea County Park. Although not registered as a National Historic Site, there have been prehistoric Indian artifacts located along the Cedar Creek dating back to 10,000 B.C..

d) Planning Objectives

The water and related land resource problems and opportunities identified in this study are stated as specific planning objectives to provide focus for the formulation of alternatives. These planning objectives reflect the problems and opportunities and represent changes in the without project conditions. The planning objectives are specified as follows:

Spy Run Creek

- To reduce flooding damages to the Eastbrook and Westbrook neighborhoods along Spy Run Creek
- To restore a more natural river system along Spy Run Creek
- To restore and preserve wetlands to benefit plant and animal communities, reduce sediment transport, and improve aquatic habitat
- To reduce overbank flooding in the upper Spy Run Creek, which is not related to backwater effects of the St. Mary's River
- To establish a clear link between implementation of restoration activities and measurable improvements

St. Joseph River – Cedarville Reservoir

- To restore and preserve wetlands to benefit plant and animal communities, reduce sediment transport, and improve aquatic habitat
- To establish a clear link between implementation of restoration activities and measurable improvements

e) Planning Constraints:

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that should not be violated. The planning constraints identified in this study are as follows:

Spy Run Creek

There is limited area to develop large wetland areas. The western and northern portions of the watershed lie outside of the Fort Wayne limits. The upstream limit of the watershed is the unincorporated Allen County area (Washington Township) which comprises approximately 6.75 square miles or 45% of the total Spy Run Watershed area. The downstream end of the watershed includes high-density residential areas in Fort Wayne. The central part of the watershed, along I-69 and Coliseum Boulevard is comprised of high-density commercial and industrial development with some scattered residential clusters. The northeast part of the watershed includes mostly lower density residential development. Smith Field, a small airport, is also located in the northeastern part of the watershed. In the northwest portion of the watershed, farms, larger industrial parks, low density residential, and trailer parks are the predominate land use.

St. Joseph River – Cedarville Reservoir

- The establishment of Leo-Cedarville does not own the reservoir, nor the property around its perimeter. The owner of the property, the City of Fort Wayne, has indicated that they would not be willing to participate in a cost shared project at the Cedarville Reservoir.

- Although Cedar Creek has not been registered as a National Historic Site, there have been prehistoric Indian sites located along the creek dating back to 10,000 BC.

f) Measures to Address Identified Planning Objectives:

A management measure is a feature or activity at a site, which address one or more of the planning objectives. A variety of measures were considered, some of which were found to be infeasible due to technical, economic, or environmental constraints. Each measure was assessed and a determination made regarding whether it should be retained in the formulation of alternative plans. The descriptions and results of the evaluation of the measures considered in this study are presented as follows:

Spy Run Creek (Flood Control) Alternatives

There were six (6) alternatives evaluated for flood control at Spy Run Creek.

Alternative 1 – No Action
Alternative 2 – Construct Regional Detention Basins along Spy Run Creek
Alternative 3 – Construct an Adjustable Head Dam near the mouth of Spy Run Creek
Alternative 4 – Construct a Flood Control Levee along Spy Run Creek in the neighborhood of Eastbrook and Westbrook Avenues
Alternative 5 – Buyouts
Alternative 6 – Home Flood Proofing

1) **Alternative 1 – No Action.** The Corps is required to consider the option of "No Action" as one of the alternatives in order to comply with the requirements of the National Environmental Policy Act (NEPA). No Action assumes that no project would be implemented by the Federal Government or by local interests to achieve the planning objectives. No Action, which is synonymous with the Without Project Condition, forms the basis from which all other alternative plans are measured.

2) **Alternative 2 – Construct Regional Detention Basins along the Spy Run Creek.** This alternative is based on information presented in the *Spy Run Watershed Master Plan, dated February 1996,* prepared for the City of Fort Wayne by RUST Environment & Infrastructure. Several potential improvements were developed to address overbank flooding along the Spy Run Creek not related to the backwater effects of the St. Mary's River. The master plan report evaluated four (4) potential flood storage sites and concluded that construction of the 4 sites would result in flow and stage reductions in the non-backwater channel reaches. There are 3 in line sites on the Spy Run Creek mainstream, and one is an off-line reservoir along Lowther Neuhaus Ditch. The total cost identified in the *Spy Run Watershed Master Plan, February 1996,* for construction of the four basins is $ 14,503,200. The following is a summary of the 4 storage basins:

- The northernmost proposed detention pond is located on Spy Run Creek just upstream of the Conrail railroad tracks, north of Cook Road. The area is presently agricultural but is projected to develop as a residential area. The proposed detention pond would provide 70.9 acre-foot of storage and reduce flows to 8 cfs in the 100-year event. The estimated cost provided in the *Spy Run Watershed Master Plan* is $ 760,000.

- A detention pond north of Washington Center Road is located at the confluence of Washington ND #2 and Spy Run Creek. It is intended to mitigate the backwater problems, which flood the trailer parks along Drains No. 2 and No. 7. A 300 acre-foot storage facility would be created. The estimated cost of this detention pond in the *Spy Run Watershed Master Plan* is $ 6,800,000.

- The City would like to purchase the open space along the Spy Run Creek, from Franke Park to West Coliseum Boulevard for development into a recreational area. The design included a 15-acre permanent recreational pond for fishing and boating. In addition, 906.1 acre-feet of flood storage could be made available by raising 2,100 feet of Goshen Road north of Lowther Neuhaus Ditch. Preliminary analysis of the site indicates flow could be reduced by as much as 2,000 cfs. The construction cost of the detention pond in the *Spy Run Watershed Master Plan* is $ 2,926,000.

- The flows along Spy Run Creek through Fort Wayne are reduced by the inclusion of detention upstream of Goshen Road on Lowther Neuhaus Ditch. The plan is to divert flow over a 30-foot weir into an offline detention pond when the river stage exceeds elevation 775. Similar to the Franke Park detention improvement, 1,500 feet of Goshen Road, north of Lowther Neuhaus Ditch would be raised. Berms totaling 3,300 feet would be required on both sides of Lowther Neuhaus Ditch. Appropriate freeboard would be allotted between the critical water surface elevation and the top of berm at elevation 780. The facility provides a maximum of 125 acre-feet of flood storage. The estimated cost provided in the *Spy Run Watershed Master Plan* is $ 4,017,200.

3) **Alternative 3 – Construct an Adjustable Head Dam near the mouth of Spy Run Creek.** The primary source of floodwaters in the Westbrook and Eastbrook neighborhoods is caused by backwater from the St. Mary's River. The adjustable dam alternative would prevent the St. Mary's River backflow from going up the Spy Run Creek to the Eastbrook and Westbrook neighborhoods. Flow from the Spy Run Creek would have to be pumped over the dam. This dam would only be needed during flood events, therefore, it would have an adjustable crest. The dam would consist of a stoplog structure that would only be adjusted during times of St. Mary's flooding. The dam would be located near Fourth Street in the Lawton Park area. In addition to the dam, a dike would be required to keep water from flanking the dam. There is a floodwall on the eastside of Spy Run that can be used.

On the west side a levee would have to be constructed to an approximate 4-foot height and extend about 1,000 feet from the dam to Clinton Street which would be integrated with the levee constructed along Clinton Street as part of the Fort Wayne Flood Control Project. Approximately 0.5 acres of property on each side of Spy Run Creek at 4th Street would be required for site access, pumping station structures, and work areas. In addition, about 0.9 acres of property will be required along the west bank of Spy Run Creek for the 1,000 foot levee. This alternative will not impact the flood storage area between the St. Mary's River and Fourth Street. In addition, a storm water pumping system would be required to move flow from Spy Run Creek around or over the dam. The installation would consist of two large storm water pumps (2,000gpm), a pump station, flap gates and a manually adjustable stop log dam. Table 2 provides cost information for Alternative 3.

Table 2 – Spy Run Creek Flood Control
Alternative 3 Cost Estimate
Construct an Adjustable Head Dam near the mouth of Spy Run Creek

Item Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
Construction				
Mob and Demobilization	1.0	LS	$ 50,000.00	$ 50,000.00
Construct Dam	1.0	LS	1,500,000.00	1,500,000.00
Berm Construction				
a) Fill	2,400.00	CY	10.00	24,000.00
b) Top Soil	400.00	CY	15.00	6,000.00
c) Seeding	3,700.00	SY	2.00	7,400.00
Subtotal				1,587,400.00
Contingency (25%)				396,900.00
Construction Cost				1,984,300.00
Non-Construction				
E&D				509,200.00
S&A (5% Construction)				99,200.00
E&D During Const (3%)				59,500.00
Lands, Easements, ROW				18,000.00
Non-Construction Cost				685,900.00
Total Project Cost				$2,670,200.00

4) **Alternative 4 – Construct a Flood Control Levee along Spy Run Creek in the neighborhood of Eastbrook and Westbrook Avenues.** The levee would consist of one half of a clay or earthen levee section with vinyl or plastic sheet piling along the streamside of the levee. A cross-section of the plastic sheet pile wall is provided as Attachment 8. The sheeting would have a wooden cap. The top width of the levee would be 3 feet. In order to minimize space, a ½ levee section would be constructed. The streamside of the levee will be vinyl or plastic sheet piling which is less expensive that steel sheeting. The land side of the levee will be clay with 1V:2H side slopes. Based on existing mapping the top of the existing grade along the streambank will be assumed to be 753-feet from Clinton to State Streets and 754-feet from State Street to the upstream end of the project. The downstream limit of the project is Clinton Street. The upstream end of the project is Northway Avenue for the Westbrook neighborhood and Oakridge Drive for the Eastbrook neighborhood. The levee will be on both sides of Spy Run along Eastbrook and Westbrook and parallel to the stream until it ties into high ground at elevation 760 feet. On the Westbrook side the high ground will be at Northway Avenue and on the Eastbrook side the high ground will be at Oakridge Drive. Each levee will be approximately 2,000 feet in length. Approximate 3.12 acres of property would need to be acquired for levee construction and maintenance along both sides of Spy Run Creek in the Eastbrook and Westbrook neighborhoods. During the design phase, the type and depth of sheeting will require further investigation. The use of sand filled cribs would also be considered. The 100-year flood stage elevation is 759 feet (NGVD) at State Street, which is the near center of the Eastbrook and Westbrook neighborhood. The top elevation of the levee is 760 feet (NGVD), however, during the feasibility study the possibility of meeting FEMA requirements will be investigated. Eastbrook and Westbrook streets would be turned into one-way streets. Table 3 provides cost information for Alternative 4. It should be noted that this alternative assumes that the State Street Bridge over Spy Run would be rebuilt with non-federal funds. The rebuilt bridge would have high curbs that the proposed levees could be tied into.

Table 3 – Spy Run Creek Flood Control Alternative 4 Cost Estimate Construct a Flood Control Levee along Spy Run Creek in the neighborhood of Eastbrook and Westbrook Avenues				
Item Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
Construction				
Mob and Demobilization	1.00	LS	$ 50,000.00	$ 50,000.00
Westbrook				
d) Vinyl Sheet Pile	28,000.00	SF	12.00	336,000.00
e) 3” dia galv pipe	1,000.00	EA	35.00	35,000.00
f) Fill	4,300.00	CY	10.00	43,000.00
g) Top Soil	450.00	CY	15.00	6,800.00
h) Seeding	4,300.00	SY	2.00	8,600.00
i) Wood Cap	2,000.00	LF	8.00	16,000.00
Eastbrook				
a) Vinyl Sheet Pile	28,000.00	SF	12.00	336,000.00
b) 3” dia galv pipe	1,000.00	EA	35.00	35,000.00
c) Fill	4,300.00	CY	10.00	43,000.00
d) Top Soil	450.00	CY	15.00	6,800.00
e) Seeding	4,300.00	SY	2.00	8,600.00
f) Wood Cap	2,000.00	LF	8.00	16,000.00
Subtotal				940,800.00
Contingency (25%)				235,200.00
Construction Cost				1,176,000.00
Non-Construction Cost				
E&D				509,200.00
S&A (5% Construction)				58,800.00
E&D During Const (3%)				35,300.00
Lands, Easements, ROW				78,000.00
Non-Construction Cost				681,300.00
Total Project Cost				$1,857,300.00

5) **Alternative 5 - Buyouts** The home buyout cost was determined based on the number of structures in the area and assigning an estimated cost for each structure. The Eastbrook and Westbrook neighborhood (including Clinton and State Streets) contains homes on several streets in close proximity to Spy Run Creek. These homes are the only ones that may experience flood damage. This alternative considers removal of these homes from the flood area. The available mapping indicates all homes that are located within the 100-year flood elevation of 759 feet. Approximately 7.2 acres of property would need to be acquired for this alternative. Table 4 provides cost information for Alternative 5. The following are street names and structures impacted:

Site	Number of Homes
Westbrook	30 Homes
Eastbrook	31 Homes
Clinton	8 Homes
State	9 Homes

Table 4 – Spy Run Creek Flood Control
Alternative 5 Cost Estimate
Buyouts

Item Description	Quantity	Unit/Meas	Unit Cost	Total Cost
Construction				
Mob and Demobilization	1.00	LS	$ 50,000.00	$ 50,000.00
Purchase of Homes				
a) Westbrook	30.00	EA	41,200.00	1,236,000.00
b) EastBrook	31.00	EA	59,200.00	1,835,200.00
c) Clinton	8.00	EA	59,600.00	476,800.00
d) State	9.00	EA	59,600.00	536,500.00
Demolition of Homes				
a) Westbrook	30.00	EA	20,000.00	600,000.00
b) Eastbrook	31.00	EA	20,000.00	620,000.00
c) Clinton	8.00	EA	20,000.00	160,000.00
d) State	9.00	EA	20,000.00	180,000.00
Site Restoration	1.00	LS	100,000.00	100,000.00
Subtotal				5,794,000.00
Contingency (25%)				1,448,600.00
Construction Cost				7,243,000.00
Non-Construction Cost				
E&D				509,200.00
S & A (5% Construction)				362,200.00
E&D During Const (3%)				217,300.00
Lands, Easements, ROW				471,000.00
Non-Construction Cost				$ 1,559,700.00
Total Project Cost				$ 8,802,700.00

6) **Alternative 6 – Home Flood Proofing.** This option would consist of flood proofing individual structures in the neighborhood. This will require installation of wood and plastic barriers around basements and first floors to prevent water from entering structures. The flood proofing will vary from structure to structure based on the elevation of the outside ground and its relationship to the structures. In all cases, any openings would be made impermeable to the passage of water. In some cases, a small ring levee may be used to flood proof the structures. Because the flood proofing will be done on an individual basis, the estimated cost calculated was assumed to be an average typical structure. The approximate area of the combined 78 homes in the affected area is 7.2 acres. Table 5 provides cost information for Alternative 6.

Table 5 – Spy Run Creek Flood Control
Alternative 6 Cost Estimate
Home Flood Proofing

Item Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
Construction				
Mob & Demobilization	1.00	LS	$ 50,000.00	$ 50,000.00
Flood Proofing of Homes				
a) Westbrook	30.00	EA	20,000.00	600,000.00
b) Eastbrook	31.00	EA	20,000.00	620,000.00
c) Clinton	8.00	EA	20,000.00	160,000.00
d) State	9.00	EA	20,000.00	180,000.00
Site Restoration	1.00	LS	50,000.00	50,000.00
Subtotal				1,660,000.00
Contingency (25%)				415,000.00
Construction Cost				2,075,000.00
Non-Construction Cost				
E&D				509,000.00
S&A (5% of Construction)				103,800.00
E & D during Const (3%)				62,300.00
Lands, Easements, ROW				87,800.00
Non-Construction Cost				762,900.00
Total Project Cost				$2,837,900.00

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Spy Run Creek (Aquatic Habitat Restoration)

There were 3 alternatives evaluated for aquatic habitat restoration at Spy Run Creek.

Alternative 1 – No Action
Alternative 2 – Wetland Creation and Stream Improvements at Franke Park along Spy Run Creek
Alternative 3 – Remove Dams near Sherman Boulevard in Franke Park and Lawton Park.

1) **Alternative 1 – No Action.** The Corp is required to consider the option of "No Action" as one of the alternatives in order to comply with the requirements of the National Environmental Policy Act (NEPA). This alternative assumes that no project would be implemented by the Federal Government or by local interests to achieve the planning objectives. No Action, which is synonymous with the Without Project Condition, forms the basis from which all other alternative plans are measured. No Action towards restoration of habitat would allow the environment to remain in a degraded condition.

2) **Alternative 2 – Wetland Creation and Stream Improvements at Franke Park along Spy Run Creek.** Franke Park is about 2 miles upstream of the Eastbrook and Westbrook neighorhood. A wetland, approximately 10-15 acres in size, would be established in the northwest quadrant of Franke Park. During the next phase of this study the most appropriate size of the wetland in Franke Park will be evaluated. The boundary of the wetland would be Louisedale Drive on the north, Parkside Drive on the west, and the former Soap Box Derby track location on the east. The wetland would receive water from Spy Run Creek during high flow periods through a controlled inlet pipe. A manually operated weir would regulate the water elevation in the wetland with discharge to Spy Run. Appropriate plantings will be established to initiate wetland growth. In addition, stream improvements, deep holes and boulder runs (riffle-pools), in Spy Run Creek would be established. The wetland would provide storage for floodwaters, but would have minimal impact on downstream flooding in the Eastbrook and Westbrook neighborhood. The wetland would act as a sediment trap and thereby improve water quality and clarity. The City would like a wetland that could be linked with trails and walkways to provide a nature education experience.

During preparation of this report, several discussions were held with the IDNR (Jed Pearson) to coordinate the proposed wetland project. Prior to this Section 905(b) Analysis the IDNR proposed to impound Spy Run Creek by constructing a dam in the northwest quadrant of Franke Park. This is outlined in a 1990 IDNR publication, entitled: *Current Fish Resources and Fishing Opportunities in Fort Wayne, Indiana (Jed Pearson).* This recommendation was for a much larger wetland to be created by purchase of property north of Franke Park to Highway 30.

Table 6 provides cost information for Alternative 2.

Table 6 – Spy Run Creek Aquatic Habitat Restoration Alternative 2 Cost Estimate Wetland Creation (15 acres)				
Item Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
Construction				
Mob and Demobilization	1.00	LS	$ 50,000.00	$ 50,000.00
Creation of Wetland				
a) Excavation	43,000	CY	2.70	116,100.00
b) Trucking (30% fluff)	56,000	CY	3.40	190,400.00
c) Pipe	1.00	LS	1,000.00	1,000.00
d) Weir Outlet	1.00	LS	10,000.00	10,000.00
e) Riffle-Pools	6.00	EA	10,000.00	60,000.00
Subtotal				427,500.00
Contingency (25%)				106,900.00
Construction Cost				534,400.00
Non-Construction Cost				
E&D				314,000.00
S&A (7.5% Construction)				40,100.00
E&D during Const (1%)				5,300.00
Land, Easements, ROW	15.00	Acre	25,000.00	375,000.00
Non-Federal Admin Cost				15,000.00
Non-Construction Cost				749,400.00
Total Project Cost				$ 1,283,800.00

3) **Alternative 3 – Remove Dams near Sherman Boulevard in Franke Park and Lawton Park.** Removal of the dams would restore a more natural river system. The dams impede migration of fish, increase water temperature and create slow-moving water habitat more suitable to carp, shad and bullheads and less suitable for more popular game fish species. Habitat conditions would improve for aquatic invertebrates, non-game fish and sport fish. Removal of the dams would help restore the river to its pre-impoundment conditions, although it would have to be tied to greater water retention of the headwaters of Spy Run.

St. Joseph River – Cedarville Reservoir (Aquatic Habitat Restoration)

There were 2 alternatives evaluated for aquatic habitat restoration at the St. Joseph River – Cedarville Reservoir.

Alternative 1 – No Action
Alternative 2 – Establish a Wetland Area along the Eastern Side of the Cedarville Reservoir

1) **Alternative 1 – No Action.** The Corps is required to consider the option of "No Action" as one of the alternatives in order to comply with the requirements of the National Environmental Policy Act (NEPA). No Action assumes that no project would be implemented by the Federal Government or by local interests to achieve the planning objectives. No Action, which is synonymous with the Without Project Condition, forms the basis from which all other alternative plans are measured. No Action towards restoration of habitat would allow the environment to remain in a degraded condition.

2) **Alternative 2 – Establish a Wetland Area along the Eastern Side of the Cedarville Reservoir.** A boardwalk would be constructed along the wetland and/or park area and tied to the nearby Cedar Creek and Mantea Park by an educational theme. Archeological sites dating to 10,000 B.C. have been located along the Cedar Creek. Coordination of the proposed wetland was made with Jed Pearson, IDNR, who has authored several publications. See prior reports reviewed in Chapter 4, pages 5 and 6.

g) Preliminary Plans

1) Preliminary Plans eliminated from further consideration

Spy Run Creek (Flood Control)

Alternative 2 was eliminated from further consideration.

Alternative 2, Construct Regional Detention Basins along Spy Run Creek, was eliminated because it was not economically justified. This is based on the available benefits identified in this report and the construction costs established in the *Spy Run Watershed Master Plan, dated February 1996.* The cumulative construction cost for all 4 sites was $ 14,503,200. As determined in the Economic Evaluation, about one-half of the benefits available for all 8 reaches of the Spy Run Creek were identified to be in Reach West 1. The remaining benefits are spread across the remaining 7 reaches. A significant portion of land areas in the remaining 7 reaches includes agricultural and park land and unincorporated property. Although this alternative would satisfy the planning objective to reduce overbank flooding in the upper Spy Run Creek, which is not related to the backwater effects of the St. Mary's River, the City of Fort Wayne did not express interest in consideration of this alternative.

Spy Run Creek (Aquatic Habitat Restoration)

Alternative 3, Remove dams near Sherman Boulevard in Franke Park and Lawton Park, was eliminated from further consideration. Although this alternative would satisfy the planning objective to restore a more natural river system, the City of Fort Wayne did not express interest in consideration of this alternative.

St. Joseph River – Cedarville Reservoir (Aquatic Habitat Restoration)

Alternative 2 was eliminated from further consideration. The town of Leo-Cedarville would be interested in cost sharing a project to establish a wetland, boardwalk and/or park area along the eastern boundary of the Cedarville Reservoir. Habitat in the reservoir could be improved by deepening with associated sediment removal. The reservoir would require modifications to regulate water levels for fish and wildlife uses.

The Cedarville Reservoir watershed is 763 square miles and consists mainly of farmland. Much of the west shore of the Cedarville Reservoir and a small portion of the east shoreline are residentially developed. Habitat at the reservoir is limited by inadequate depth, lack of cover and turbidity. Water temperature does not change much from top to bottom, however, oxygen concentrations drop near the bottom. Few aquatic plants are present. Periodic fish kills in the winter months have been reported and fish consumption advisories are in effect on several species of fish. Only species able to withstand these conditions, such as black bullheads and carp, are flourishing to a level where they also adversely impact fish habitat by roiling up bottom sediments. There appears to have been little change in the fish community over the past 33 years. The Indiana DNR determined that due to the excessive numbers of bullheads and carp, that it is unlikely that efforts to reduce inputs of additional sediment into the reservoir through various watershed management programs would improve fishing. Since at least 1986, the IDNR has not recommended fish management activities. The reservoir supports a poor quality sport fish population. Except for channel catfish and white crappies, few desirable-size game fish are available. Attempts to improve fishing opportunities by stocking white bass and walleyes have been unsuccessful.

There are competing interests for utilization of the reservoir between the City of Fort Wayne, which owns and operates it as part of its municipal water supply, and the Leo-Cedarville community it is located in. The City of Fort Wayne, expressed no interest in becoming a sponsor or partner with the town of Leo-Cedarville for a project to improve the aquatic habitat at the Cedarville Reservoir.

The Indiana DNR indicated that it would be difficult to produce a high quality wetland at Cedarville Reservoir due to the existing conditions. It is anticipated that only a low quality wetland could be established by sectioning off a portion of the reservoir with berms and constructing a water control structure.

The planning objective to establish a clear link between implementation of restoration activities and measurable improvements could not be established. Also, we were not able to establish a reasonable probability that a project could contribute significantly to the benefit of plant and animal communities

2) Preliminary Plans for further Consideration

Spy Run Creek (Flood Control)

Alternatives 1, 3, 4, 5 and 6 will be considered for further evaluation.

Alternative 4 was for construction of a flood control levee along Spy Run Creek in the Eastbrook and Westbrook neighborhood. The benefit-to-cost ratio and net benefits were 4.96 and $ 640,900.00, respectively. Flooding of the Spy Run Creek south of State Boulevard to its confluence with the St. Mary's River is due to the St. Mary's backwater effect during the 100-year flood event. The majority of flood damage occurs to the Eastbrook/Westbrook neighborhood of Ft. Wayne. This area was not included in the ongoing Ft. Wayne Flood Control project because its benefit-to-cost ratio was below unity. However, it is felt that a smaller levee for flood control could be constructed to a lower flood elevation than the recently built flood protection project. The flood protection for the Eastbrook & Westbrook neighborhood would start at Clinton Avenue on the east and extend to Northway Avenue for the Westbrook Avenue neighborhood and Oakridge Road for the Eastbrook Avenue neighborhood. The flood protection would be a ½ earthen levee. The streamside of the levee would be made of vinyl or plastic sheet piling. The land side would be compacted clay with a sideslope of 1V:2H. The top width would be 3 feet. The top of the levee would be 760-feet NGVD. Provided as Attachment 8 is a typical cross-section of the clay and plastic sheet piling floodwall. This value represents the 100-year flood stage elevation at State Boulevard plus 1 foot of freeboard. State Boulevard is located approximately in the middle of the area to be protected. The levee would be tied into high ground at the 760-foot elevation. Eastbrook and Westbrook streets would have to be made into 1-way streets. A portion of the right-of-way would be used for the levee. This alternative assumes that the State Street Bridge over Spy Run Creek would be rebuilt with non-Federal funds. The rebuilt bridge would have high curbs to tie the proposed levee into.

Alternatives 1, 3, 5 and 6 will also considered for further evaluation. Alternative 1 is the "No Action" plan. If no project were implemented water quality and clarity would continue to degrade over time and particularly during heavy rains which would impact fish and aquatic habitat. Alternative 3 involves the construction of an adjustable dam at the mouth of the Spy Run Creek at its confluence with the St. Mary's River. The benefit-to-cost ratio for Alternative 3 is 3.45. Alternative 5, Buyouts, had a benefit-to-cost ratio of 1.05. Alternative 6 involves home flood proofing. The benefit-to-cost ratio for Alternative 6 is 3.24.

The alternatives for flood damage reduction meet the necessary Federal interest criteria, i.e. Federal regulations and policies. The alternatives also have the support of the local sponsor, the City of Fort Wayne, Indiana. This 905(b) economic analysis indicates that flood damage reduction benefits would outweigh the cost. Alternatives 3, 4, 5 and 6 satisfy the planning objective to reduce flooding damages to the Eastbrook and Westbrook neighborhoods.

This report recommends initiating a study for flood control on the Spy Run Creek in the vicinity of the Eastbrook and Westbrook neighborhoods, Fort Wayne, Indiana under Section 205, Flood Control Act of 1948, as amended.

Spy Run Creek (Aquatic Habitat Restoration)

Alternatives 1 and 2 were selected for further consideration.

Alternative 1 is the "No Action" plan. If no project were implemented water quality would continue to degrade over time and particularly during heavy rains which would impact fish and aquatic habitat.

Alternative 2 is for establishment of wetland and stream improvements in the northwest quadrant of Franke Park. Impoundment of water via a controlled inlet pipe would establish a 10-15 acre wetland. The inlet pipe and a weir would allow for water level control. Stream improvements would consist of intermittent deep holes and strategic placement of boulders to create riffles and pools and thereby provide habitat diversity.

A riparian wetland would offer some of the integrity, productivity, stability and biological diversity of riparian wetlands that were once common along Spy Run Creek and the other Maumee River tributaries. The proposed wetland would restore a valuable public resource. Functions of a Spy Run Creek wetland that are important to the public interest include, food chain production, general habitat, nesting, spawning, rearing and resting sites for aquatic and land species. The wetland would also serve as a valuable storage area for storm and floodwaters in an area which historically experiences flooding. In addition the riparian wetland would provide a natural filtration process for waters which pass through it, contributing to improvements in water quality.

There are no large expanses of wetlands left in the project vicinity. The landscape near Spy Run Creek is dotted with small palustrine-emergent, palustrine-forested, and palustrine-scrub/shrub wetlands, but many fringe wetlands along the Spy Run corridor have been lost to urbanization. Agricultural demands have also caused a significant destruction of marsh in rural areas beyond the Fort Wayne vicinity. Spy Run has been shown to have impairment to aquatic and wildlife habitat *(Current Fish Resources and Fishing Opportunities in Fort Wayne, Indiana, IDNR, 1990)*. The probable source of impairment is listed as land development and surface runoff. Creation of this wetland along the Spy Run corridor would restore a portion of lost wetland habitat while providing some flood storage capacity and associated benefits to water quality. Wetlands would improve the character of the riparian zone, providing additional valuable habitat for fish and wildlife.

The Final Environmental Impact Statement for the Fort Wayne Flood Control Project, Appendix A, dated September 1987, indicated that the Maumee River basin's wildlife populations have been declining through the years. Farming practices have reduced protective cover and food producing areas for wildlife. Degradation of water quality has caused a decline in the quality of marsh habitat. Aquatic life including mollusks and crustacea, have been badly affected by pollution. As many as 39 species of mollusks may once have been found in the Maumee River main stem, but this number has been greatly reduced. Restoration of even a small wetland in this area would contribute to the improvement of the ecosystem, acting as a sediment and nutrient trap, increasing stream biodiversity and restoring habitat suitable for wetland dependent wildlife (including birds, amphibians and small mammals). Other aquatic benefits associated with the restoration of riparian zones include streambank stabilization, sediment reduction, lowering water temperature through shading, and providing habitat for fisheries, all of which will increase food source production.

Channel improvements in Spy Run Creek would provide habitat diversity and return stream habitat in this area to conditions prior to urbanization and associated runoff, sedimentation and channel modifications. Habitat diversity in the creek would benefit the native fishery as well as enhance a stocking program already in place. The City of Fort Wayne has undertaken stocking of the Spy Run Creek with trout. Other fish, which have been identified in the Spy Run Creek, include creek chubs, green sunfish, white suckers, pumpkinseeds, bluntnose minnows, black bullheads, and sunfish. Greater depth originally provided above the dam in Frank Park has been lost to sedimentation. Water velocity is very slow most of the time from the confluence of the Lowther Newhaus Ditch to downstream of Franke Park.

To improve habitat, stream velocity in the vicinity of the wetland area would be increased by creating a series of riffles and pools and by placing boulder runs for cover. These structures would improve habitat for trout and the other fish species. Large boulders would be placed for fish cover and deep holes (10-foot depth) excavated for protection during periods of high stream velocity and during times of drought. The report entitled: *Investigation of Potential Trout Stream in Fort Wayne, 1985, IDNR,* concluded that Spy Run offered the best potential for establishment of a trout fishery. It offered adequate bank and in-stream cover, water temperatures were tolerable and oxygen concentrations were suitable for trout.

Implementation of the proposed habitat restoration measures is not expected to cause significant environmental impacts. The Fort Wayne area is know to be rich in cultural resources and the project would be undertaken with close coordination with the State Historic preservation office. The Indiana bat, bald eagle, and white cat's paw pearly mussel are endangered species, which have been known to be present in the study area. The white cat's paw pearly mussel is generally found in riffle/rapids areas.

A 1986 mussel survey of the rivers in Fort Wayne found no specimens of the white cats paw pearly mussel in the three major rivers of Fort Wayne (St. Mary's, St. Joseph, and Maumee). The U.S. Fish & Wildlife Service would be consulted on endangered/threatened species status. The character of the material to be excavated for wetland creation and the channel sediments to be removed for pool creation would be determined in the feasibility phase. This material would be reused or appropriately disposed of. An evaluation in accordance with the National Environmental Policy Act would be conducted in the feasibility phase.

This report recommends initiating a study for aquatic ecosystem restoration and channel improvements at Franke Park, under Section 206 of the Water Resources Development Act of 1996. This alternative would satisfy the planning objective to restore and preserve wetlands to benefit plant and animal communities, reduce sediment transport, and improve aquatic habitat.

St. Joseph River – Cedarville Reservoir (Aquatic Habitat Restoration)

Alternative 1 was selected. This is the "No Action" plan. It could not be shown that there is a reasonable probability that a project at this site would contribute significantly to the benefit of plant and animal communities, reduce sediment transport, and improve the ecosystem. This is one of the identified project objectives. Another objective to establish a clear link between implementation of restoration alternatives and measurable improvements in the ecosystem was not met. Establishment of a wetland at the site would require separating it from the rest of the reservoir by levees or dikes and construction of a water control structure. Due to sedimentation and agricultural runoff at the reservoir, it is anticipated that only a low quality wetland would be developed. It is expected that due to the shallow depth of the reservoir and continued sedimentation and turbidity problems that the reservoir habitat will continue to degrade. Possible projects for dam removal or dredging of the reservoir would not be acceptable to the property owner, the City of Fort Wayne. The City of Fort Wayne expressed no interest in becoming a sponsor or partner with the town of Leo-Cedarville for a project at the Cedarville Reservoir. The State of Indiana Department of Natural Resources indicated that it would be vary difficult to produce a high quality wetland at Cedarville Reservoir due to the existing conditions.

h) Conclusions from the Preliminary Screening

Spy Run Creek (Flood Control)

The conclusions from the preliminary screening form the basis for the next iteration of the planning steps that will be conducted in the **feasibility phase**. The likely array of alternatives that will be considered in the next iteration includes evaluation of the modified levee plan (Alternative 4), that consists of vinyl or plastic sheet piling on the creek side and clay on the land side. The potential magnitude and types of benefits from the proposed action would include the reduction of water damage to 78 homes during the 100-year flood event. The environmental effects of potential measures include a reduction in bank erosion and sediment transport. Construction of an adjustable head dam (Alternative 3), home buyouts (Alternative 5), and home flood proofing (Alternative 6) will be considered in the next iteration as well as the No Action Plan (Alternative 1).

Spy Run Creek (Aquatic Habitat Restoration)

The conclusions from the preliminary screening form the basis for the next iteration of planning steps that will be conducted in the **Planning and Design phase**. The likely alternatives that will be considered in this phase include Alternative 1, No Action Plan, and Alternative 2, Establish a Wetland Area along the Eastern Side of the Cedarville Reservoir. In the vicinity of the wetland restoration/creation along Spy Run Creek, stream improvements would be made for fish shelter and protection. The environmental benefits of wetland creation are numerous. The cumulative benefits of small wetlands can be significant. At Spy Run Creek the created wetland along with stream improvements would provide improved habitat for fish and wildlife. The host vegetation would remove nutrients and sediments from surface and groundwater. The created wetland would be expected to form barriers to erosion and trap contaminants and heavy metals. Finally, although in a minor way due to its size, the 10-15 acre wetland would temporarily soak up water after storms and release it slowly, protecting downstream property owners from flood damage. Franke Park is approximately 290 acres in size.

St. Joseph River – Cedarville Reservoir

No project has been recommended for the next phase of planning steps at the Cedarville Reservoir. In discussions with the Indiana Department of Environmental Management, Susan McLoud (317-232-0019), an additional source of assistance for the town of Leo-Cedarville was identified. This alternative is the Non-point Source Program as provided under Section 319 of the Clean Water Act.

Federal (EPA) funds are provided to States for the purpose of assisting local communities with water pollution problems. The Section 319 program provides for various voluntary projects throughout the State of Indiana to prevent water pollution and also provides for assessment and management plans related to water bodies in Indiana impacted by non-point source pollution. The State of Indiana has utilized Section 319 for such projects as: urban runoff controls, land development mitigation, on-site sewerage disposal improvements, prevention of soil and stream bank erosion, agricultural pesticide information activities, cost-share programs for installation of water quality improvement practices, and habitat restoration. The focus of these projects has been on such tasks as the adoption of Best Management Practices for water pollution control, pollution prevention activities, and education and technical assistance.

6. FEDERAL INTEREST

Spy Run Creek (Flood Control)

Since flood control is an output with a high budget priority and that flood damage reduction is the primary output of the alternatives to be evaluated in the **feasibility** phase, there is a strong Federal interest in conducting the feasibility study. Based on the preliminary screening of alternatives, there appears to be a potential project alternative that would be consistent with Army policies, costs, benefits, and environmental impacts.

Based on our preliminary analysis it appears that a structural flood control project along the Spy Run Creek in the neighborhood of Eastbrook and Westbrook Avenues is economically justified. At the time of the Final Feasibility Report and Final Environmental Impact Statement, Fort Wayne and Vicinity, Indiana, Flood Control Study, September 1987, there were eighty-two (82) residential properties in the 100-year flood plain with estimated annual average damages of $ 355,700 from the 100-year flood event. Levee modification, backwater dam, home flood proofing, and home buyouts were evaluated during the study.

Project Benefits for Spy Run Creek (Flood Control)

The *Final Feasibility Report and Final Environmental Impact Statement, September 1987,* presented an analysis of flood control along Spy Run Creek. The NED plan involved upgrading existing levees and floodwalls along the Maumee, St. Mary's, and St. Joseph River's to provide 200-year level protection. However, the plan designed and presented in the General Design Memorandum (GDM) provided only 100-year protection, with no improvements along Spy Run Creek upstream of Clinton Street. Since the GDM economics did not address Spy Run Creek upstream of Clinton Street, this consideration of a potential project is primarily based on information from the Feasibility Study.

Economic Evaluation

This analysis is performed to make a determination of whether a flood protection project at Spy Run Creek would be economically feasible. This is not a complete flood damage analysis, but a reevaluation of the 1987 feasibility report and information from the GDM.

The reevaluation will use the basic components from the Feasibility Report. It will not be discussing levels of protection or the benefit cost analysis in that report. This evaluation will utilize the following from that report that relates to the Spy Run:

- Number of Structures
- Property Damages
- Content Damages
- Other Physical Damages
- Flood Emergency Cost
- Income Lost
- Advance Replacement of Bridges
- Flood Insurance Reduction

Table 7 displays the average home values by reach reported in the Feasibility Report. The City of Fort Wayne provided lump sum average market values for residential structures. Reach West 1 extends from the Penn Central railroad along the west boarder of Vesey Park downstream to Clinton Street. Reach East 1 also extends from the Penn Central railroad along the west boarder of Vesey Park downstream to Elizabeth Street. The Eastbrook and Westbrook Avenue neighborhoods are located within reaches East 1 and West 1.

Table 7
Average Residential Market Value
Feasibility Report
Spy Run Creek

Reach	# of Homes	Residential Value
East 1	39	$ 37,500
East 2	40	30,500
East 3	41	41,800
East 4	42	23,700
West 1	43	29,200
West 2	44	28,800
West 3	45	33,400
West 4	46	29,400

The City of Fort Wayne also provided individual structure and content values for nonresidential structures. These included apartments. Table 8 displays the number of structures by type for eight flood zones.

Table 8
Number of Structures Inundated by Flood
Feasibility Report
Spy Run Creek

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	200-yr	500-yr
Residential	5	38	60	67	77	93	126	163
Non-Residential	1	5	5	5	5	12	12	20
Total	6	43	65	72	82	105	105	183

Table 9 provides a breakdown of flooding in the study area by reach and depth reported in the September 1987 Feasibility Study. The values are cumulative in that all of the structures displayed as flooding greater than a certain depth are included in all lesser depths.

Table 9
Number of Structures Inundated by Reach
Lower Spy Run Creek

Depth	East 1			West 1		
(ft)	50-yr	100-yr	500-yr	50-yr	100-yr	500-yr
>-4	22	28	35	46	46	50
>-2	15	20	31	36	42	46
> 0	0	14	28	23	27	36
> 2	0	0	18	12	14	23
> 4	0	0	10	3	6	12
> 6	0	0	0	0	0	4

Fifty structures with depths more than – 4 feet in the 500-year flood are in the West 1 Reach. Most significantly for project justification, West 1 Reach contains 23 structures with flooding above the first floor in the 50-year flood. Flooding is concentrated in West 1 Reach.

At West 1 Reach forty-six (46) total structures are in the 100-year flood plain of which 27 have water above the 1st floor.

Table 10 presents a comparison of the number of structures in this reach to the number of structures identified as flooded in all eight reaches of Spy Run Creek in the Feasibility Report. The structures counted for West 1 include all structures flooded to 4 feet below the first floor in a given flood. The total number of Spy Run is probably more selective because some structure categories are not associated with damage until flooding is deeper than – 4 feet.

Table 10
Number of Structures
Flooded, by Flood

Reach	50-year	100-year	500-year
Spy Run	82	105	183
West 1	46	46	50

Prevention of Property Damage

Property damages include damages to structures and their contents. Benefits for the damages of structures and content damages are determined by comparing average annual damages without the project to average annual damages with the project. The difference between these two values is equal to the damage reduction benefits. Damages to residential contents are calculated separately.

In the Feasibility Report, residential damages for Spy Run were extremely high. It is expected that all of these damages except for an estimated 5 percent will be eliminated with the project. Table 11 displays updated average annual property damages for Spy Run Creek. Table 12 displays average annual property damage reduction benefits.

Table 11
Average Annual Property Damage
Spy Run Creek ($ 000)

Without (1) Project		June 2000 (2) Incr. Factor		June 2000 Without Project Property Damage
$ 355.7	x	1.45	=	$ 555.8

(1) From the Feasibility Study
(2) Construction Cost Index: June 1986 to June 2000 = 1.45

Table 12
Average Annual Property Damage Reduction
Spy Run Creek ($ 000)

Average Annual Damages		Average Annual (1) Residential Damages		Average Annual Damage Reduction Benefits
$ 555.8	-	$ 27.8	=	$ 528.0

(1) 5 percent based on assumption that 95% projection will occur with a project.

Prevention of Residential Content Damage

The same methodology used to calculate other property damage in the Feasibility Report was used to calculate content damages. Under existing conditions (1986) the value of residential contents was estimated to be 30 percent of the residential structure value.

Table 13 displays updated average annual content damages for the Spy Run Creek. The damages were updated using the increase in the consumer price index from June 1986 (109.5) to June 2000 (171.5). The increase for all the Urban Consumers is 1.57.

Table 13
Average Annual Content Damages
Spy Run Creek ($ 000)

Without Project		June 2000 Increase Factor		June 2000 Without Project Content Damages
$ 118.9	x	1.57	=	$ 186.7

Table 14 displays average annual content prevented. Residual damages are assumed to be 5 percent.

Table 14
Average Annual Content Damages Prevented
Spy Run Creek ($ 000)

Average Annual Content Damages		Average Annual (1) Residual Damages		Content Damages Prevented
$ 186.7	-	$ 9.3	=	$ 177.4

(1) 5 percent based on the assumption that 95 percent protection will occur with a project.

Other Physical Damages

In addition to structure and content damages, floods cause other physical damages. These include debris removal and cleanup, as well as damages to streets, bridges, levees, dams, channels, water filtration plant grounds, water lines, sewer lines, street lights, park and other infrastructure. This data was provided by the City of Fort Wayne and used in the Feasibility Study.

Other physical damages for the St. Mary's River also included damages for Spy Run Creek. There are 2,035 structures in the St. Mary's River 100-year floodplain and 105 structures for the Spy Run Creek. Therefore, the Spy Run Creek portion of average annual other physical damages would be .052 percent. The without project other average annual physical damages are $ 689,800 x .052 = $ 35,900 for the Spy Run Creek.

The updated June 2000 average annual other physical damages for the Spy Run Creek using the construction cost index increase is calculated to be 1.45 x $ 35,900 = $ 52,100. All other average annual physical damages as derived in the Feasibility Report were prevented for Spy Run Creek is $ 52,100.

Flood Emergency Cost

The flooding in and around the vicinity of Fort Wayne not only causes physical damages, but imposes other costs as well. Flood emergency costs include public agency flood cost, residential evacuation-reoccupation costs, commercial-reoccupation cost, lost wages, lost business revenues, and traffic diversion costs.

Average annual flood emergency costs with project conditions for Alternative 10 in the Feasibility Report, which includes Spy Run Creek, is $ 314,200 for the 100-year flood event. The Spy Run Creek portion of these damages is 5 percent or $ 15,700. It is assumed that these benefits would be $ 15,700 x 1.51 = $ 23,700. The index factor used in the Feasibility Report consists of 50 percent CPI and 50 percent ENR.

Income Loss

Income loss results from disruption of normal activities. Such a loss is over and above the physical flood damages and emergency cost calculated earlier. Two types of income loss were calculated in the Feasibility Report. The two types are lost wages and revenues.

Without project conditions average annual income loss for Alternative 10 which includes Spy Run Creek is $ 52,200 for wages lost and $ 44,000 for lost revenue for a total of $ 96,200. Spy Run Creek's portion of this would be a 5 percent or $ 4,800. The June 2000 index factor used to update this benefit is the same factor used for Flood Emergency Cost. The updated income loss benefits for Spy Run Creek are $ 4,800 x 1.51 = $ 7,200.

Flood Insurance Reduction

Benefits can be taken for reducing the number of flood insurance policies in the project area equal to the cost of serving these policies. In the Feasibility Report the flood insurance operations cost was $ 85 per policy. Data supplied by FEMA Region V at that time state that there are 1,164 policies in effect in the study area. It is assumed that all of the residents of the 105 structures in the 100-year floodplain at Spy Run Creek have flood insurance.

The latest Economic Guidance Memorandum 99-04, National Flood Insurance Program provides the latest operating cost per policy. The present fiscal year operating cost to be used for Corps of Engineers economic evaluations is $ 138 per policy. Therefore, the savings in flood insurance cost for Spy Run Creek is 105 policies x $ 138 per policy = $ 14,500.

Table 15 displays a summary of all benefits by category for a project.

Table 15 – Benefit Summary (1,000's)	
Property Damages Prevented	$ 528.0
Content Damages Prevented	177.4
Other Physical Damages Prevented	52.1
Flood Emergency Cost Prevented	23.7
Income Loss Prevented	7.2
Flood Insurance Reduction	14.5
Total Average Annual Benefits	$ 802.9

Summary of Benefits and Cost

Table 16 shows average annual benefits and costs for each of the proposed alternatives. Interest during construction was calculated using uniform annual payments and an interest rate of 6 – 5/8 %. Also, shown in the tables are net benefits (equal to the difference between average annual benefits/costs) and benefit cost ratios for each alternative. An alternative with a benefit cost ratio of one or greater is considered economically feasible. Based on this, alternatives 3, 4, 5 and 6 are economically justified. However, the alternative with the greatest net benefits is the National Economic Development (NED) plan. This plan is alternative 4.

Table 16
Spy Run Creek
Economic Summary

Costs	Alternative #3	Alternative #4	Alternative #5	Alternative #6
Construction Cost	$ 2,670,200	$ 1,857,300	$ 8,802,700	$ 2,837,900
IDC *	277,700	193,200	915,500	295,200
Investment Cost	2,947,900	2,050,500	9,718,200	3,133,100
Interest & Amortization	203,400	141,500	670,600	216,200
O&M **	29,500	20,500	97,200	31,400
Total Annual Cost	232,900	162,000	767,800	247,600
Benefits				
Eastbrook & Westbrook	802,900	802,900	802,900	802,900
B/C Ratio	3.45	4.96	1.05	3.24
Net Benefits	$ 570,000	$ 640,900	$ 35,100	$ 555,300

* Assume 6-5/8 % interest rate for 18 month construction time period
** O&M is estimated to be 1% of Construction Cost

Federal Interest

Spy Run Creek (Aquatic Ecosystem Restoration)

Ecosystem restoration projects are defined as high priority outputs in the administration's budget policy. Priority is given to restoration projects that restore degraded ecosystem structures and functions. Based on the preliminary screening of alternatives, there appears to be a potential wetland creation and stream improvement project on Spy Run Creek at Franke Park which is in the Federal interest and consistent with Army policies, costs, benefits, and environmental impacts.

Creation of a riparian wetland with stream improvement along Spy Run Creek at Franke Park would restore a small portion of wetland and stream habitat that has been lost to urbanization. Section 206 of the Water Resources Development Act of 1996, P.L. 104-303, allows projects for restoration of aquatic ecosystem structure and function. Creation of riparian wetland and stream improvements at Franke Park appears justified under Section 206 Continuing Authorities Program authority.

The proposed project at Spy Run Creek would improve the quality of the environment. The ecosystem that has been degraded over time due to urbanization would be partially restored with creation of riparian wetland and stream improvement. The created wetland would offer some of the integrity, productivity, stability and biological diversity of riparian wetlands that were once common along Spy Run Creek and the other Maumee River tributaries. Functions of a Spy Run Creek wetland that are important to the public interest include, food chain production, general habitat, and nesting, spawning, rearing and resting sites for aquatic and land species. The wetland would also serve as a valuable storage area for storm and floodwaters in an area which historically experiences flooding. In addition the riparian wetland would provide a natural filtration process for waters which pass through it, contributing to improvements in water quality. Spy Run channel improvements would provide habitat diversity in the creek and return that habitat to conditions prior to urbanization and associated runoff sedimentation and channel modifications.

The aquatic ecosystem restoration efforts identified during this reconnaissance study for Spy Run Creek at Franke Park are consistent with Federal law, regulation and policy, and are in the public interest. No significant adverse environmental impacts are anticipated from the proposed restoration actions. The preliminary analysis indicates that proposed ecosystem restoration and stream improvements are technically feasible and can be accomplished in a cost effective manner.

7. PRELIMINARY FINANCIAL ANALYSIS

Spy Run Creek (Proposed Section 205 Flood Control Project)

As the local sponsor, the City of Fort Wayne, Indiana will be required to provide 50% of the **feasibility study** costs for studies exceeding $ 100,000. The Non-Federal share of the feasibility phase is required during this phase. Feasibility phase studies under $ 100,000 are 100% Federal responsibility. The remaining Non-Federal funds shall be provided upon execution of the Project Cooperation Agreement (PCA) in the plans and specifications phase. The local sponsor shall provide without cost to the Government all lands, easements, rights-of-way, utility and facility alterations and relocations. The local sponsor must contribute in cash 5% of the total project cost. If the value of lands, easements, and rights-of-way, and relocations plus cash contribution do not equal or exceed 35% of the project cost, the sponsor must pay the additional amount necessary so the sponsor's total contribution equals 35% of total project costs. The Federal share may not exceed $ 7 million. The local sponsor is also aware of cost sharing requirements for potential project implementation. A letter of intent from the local sponsor stating a willingness to pursue the **feasibility study** and to share in its cost, and an understanding of the cost sharing that is required for project construction is included as Attachment 1.

a) All costs are in thousands of dollars **(Sec 205 Flood Control - Alternative # 4)**.

	TOTAL	NON-FED	FED	2001	2002	2003	BALANCE
Feasibility Phase	$ 351.5	$ 125.7	$ 225.8	$200.0	$151.5	$ 0	$ 0
Plans and Specs	157.7	0.0	157.7	0	78.9	78.8	0
Construction	1,348.1	527.0	821.1	0	0	150.0	1,198.10
Total	$1,857.3	$ 652.7	$1,204.6	$200.0	$230.4	$ 228.8	$ 1,198.10

b) Non-Federal Requirements:

LERRD	$ 78,000
Cash	$ 574,700
Work-in-kind	$ 0
Annual O&M	$ 13,500

Federal Allocations to Date:

Section 905(b) Analysis Report $ 100,000
Feasibilility Phase
Plans and Specifications
Implementation (Construction)

Spy Run Creek (Proposed Section 206 – Aquatic Ecosystem Restoration Project)

As the local sponsor, the City of Fort Wayne, Indiana will be required to provide 35% of the cost of construction, including the **Planning and Design phase** costs. The Non-Federal share of total project costs is required upon execution of the Project Cooperation Agreement (PCA) near the end of the 12-month planning and design phase and prior to any construction activities. The Federal share may not exceed $ 5 million. The local sponsor shall provide without cost to the Government all lands, easements, rights-of-way, utility and facility alterations and relocations. The local sponsor is also aware of cost sharing requirements for potential project implementation. A letter of intent from the local sponsor stating a willingness to pursue the feasibility study and to share in its cost, and an understanding of the cost sharing that is required for project construction is included as Attachment 2.

a) All costs are in thousands of dollars **(Sec 206 Ecosystem Restoration- Alt # 2)**

	TOTAL	NON-FED	FED	2001	2002	2003	BALANCE
Planning and Design Phase	$ 314.0	$ 0	$ 314.0	$ 200.0	$ 114.0	$ 0	$ 0
Construction	969.8	449.3	520.5	0	0	969.8	0
Total	$1,283.8	$ 449.3	$ 834.5	$ 200.0	$ 114.0	$969.8	$ 0

b) Non-Federal Requirements:

LERRD *	$	390,000
Cash	$	59,200
Work-in-kind	$	0
Annual O&M	$	5,300

- LERRD's value = LERRD's cost ($ 375,000) plus non-Federal administrative cost of $ 15,000. 15 acres are required at $ 25,000 per acre = $ 375,000.

Federal Allocations to Date:

Section 905(b) Analysis Report $ 100,000
Planning & Design Phase
Implementation (Construction)

Real Estate Requirements:

During the feasibility phase of the project the Real Estate Division will further assess the real estate requirements for the selected plan; coordinate the completion of a gross appraisal; prepare detailed information for lands, easements, rights-of-way, relocations, and disposal areas (LERRD's); and prepare a Real Estate Plan for inclusion into the feasibility report. In addition, Real Estate will attend district team meetings and participate in responding to review comments by the Independent Technical Review (ITR) team members as well as participate in the development of the project and determination of the non-Federal sponsor's legal and financial capability.

8. ASSUMPTIONS AND EXCEPTIONS

a. Feasibility Phase and Planning & Design Phase Assumptions:

The following critical assumptions will provide a basis for both of the proposed CAP projects.

Spy Run Creek (Proposed Section 205 Flood Control Project)

Assumptions for the Without Project Condition. Flooding and resulting flood damages, are expected to continue to occur in the Eastbrook and Westbrook neighborhoods in the absence of any flood damage reduction plan. Additional development will increase upstream flood flows and result in even greater property damages in combination with those damages resulting from the backwater effect.

Spy Run Creek (Proposed Section 206 Aquatic Ecosystem Restoration)

Assumptions for the Without Project Condition. Wetland habitat along Spy Run Creek and other associated Maumee River tributaries have been lost in the vicinity of Fort Wayne due to urbanization. This habitat will remain lost. The benefits associated with a wetland ecosystem would not be realized.

9. SCHEDULES

Spy Run Creek – Section 205 Flood Control:

Phase	Duration	State Date	Finish Date
Feasibility Phase (FCSA&PSP)	18 Months	Jan 2001	Jun 2002
Plans and Specifications	6 Months	Jul 2002	Dec 2002
Project Coorperation Agreement	4 Months	Jan 2003	Apr 2003
Advertisement and Award	3 Months	May 2003	Jul 2003
Construction	18 Months	Aug 2003	Jan 2005

Spy Run Creek – Section 206 Aquatic Ecosystem Restoration:

Phase	Duration	State Date	Finish Date
Planning and Design Phase	12 Months	Jan 2001	Dec 2001
Project Coorperation Agreement	4 Months	Jan 2002	Apr 2002
Advertisement and Award	3 Months	May 2002	Jul 2002
Construction	6 Months	Aug 2002	Jan 2003

10. VIEWS OF OTHER RESOURCE AGENCIES

Because of the funding and time constraints of the reconnaissance phase, only limited and informal coordination has been conducted with other resource agencies. Views that have been expressed are as follows:

a. The Indiana Department of Natural Resources supports wetland restoration at Franke Park in the City of Fort Wayne.

b. During preparation of this reconnaissance report some of the contacts made to discuss alternatives for flood control and ecosystem restoration included: the Indiana Department of Environmental Management, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, and the St. Joseph River Watershed Initiative (Allen County). Each of these agencies provided valuable input for consideration and expressed interest in the continued development of alternatives for flood control damage reduction as well as aquatic habitat restoration.

11. POTENTIAL ISSUES AFFECTING INITIATION OF THE FEASIBILITY AND PLANNING & DESIGN PHASES

a. Continuation of this study into the cost-shared phase is contingent upon an executed Feasibility Cost Share Agreement (FCSA). Failure to achieve an executed FCSA prior to completion of either the feasibility phase or the Planning and Design Phase will result in termination of the project. There are no apparent issues at this time that impact on the implementation of either the feasibility or Planning and Design phases.

b. The schedule for signing the Feasibility Cost Share Agreement is October 2001 for both the Section 205 Feasibility Study and the Section 206 Planning and Design Phase.

12. PROJECT MAPS

A location map for both study sites, Spy Run Creek and the St. Joseph River – Cedarville Reservoir is provided as Attachment 3. A location map of the proposed Section 205 site along Spy Run Creek (Eastbrook and Westbrook neighborhoods) is provided as Attachment 4. A map of the existing flood control levee location along the east bank of Spy Run Creek is provided as Attachment 5. A map of the proposed Section 206 site at Spy Run Creek (Franke Park) is provided as Attachment 6. A map of the St. Joseph River - Cedarville Reservoir at the town of Leo-Cedarville is provided as Attachment 7. Finally, a typical cross-section of a clay and plastic sheet piling floodwall proposed in Alternative 4 is provided as Attachment 8.

13. RECOMMENDATIONS

I recommend that the Spy Run Creek Section 205 Flood Control project proceed into the feasibility study and the Section 206 Aquatic Ecosystem Restoration project continue into the Planning and Design phase.

28 Sept. 2000
Date

Richard J. Polo, Jr.
Lieutenant Colonel, U.S. Army
District Engineer